

Kirtland Air Force Base (KAFB) Fuel Spill Modelers Meeting
 Albuquerque Bernalillo County Water Utility Authority (ABCWUA)
 Drinking Water Treatment Plant
 Albuquerque, NM
 April 16, 2014
 Meeting Minutes

Agenda

EVENT/ITEM		DISCUSSION TOPIC	TIME	TOPIC LEADER
1.	Welcome	Welcome attendees to meeting.	9:00 – 9:05 am	Facilitator, EPA, NMED
2.	Introductions	Acquaintance with meeting attendees.	9:05 – 9:10 am	All attendees
3.	Ground Rules	Discuss the ground rules and norms of the meeting.	9:10 – 9:15 am	Facilitator
4.	Review Agenda	Review the agenda items.	9:15 – 9:20 am	Facilitator
5.	Distribution List	Compile a list of attendee email contact information for distributing the meeting minutes.	9:20 am – 9:30 am	All attendees
6.	Water Well Pumping Rates and Schedules	<ul style="list-style-type: none"> The WUA, KAFB, and VA discuss how their wells (that are within the model boundaries) typically operate. (i.e. pump 24/7, pump only at night, on demand...) WUA, KAFB, and VA discuss short and long term groundwater use future projections; including basis, variability, and reliability of projections Group discussion of future pumping rates submitted by the VA, WUA, and KAFB 	9:30 am – 12:00 pm	All attendees
7.	Lunch	On your own	12:00 – 1:30 pm	All attendees

EVENT/ITEM		DISCUSSION TOPIC	TIME	TOPIC LEADER
8.	Water Well Pumping Rates and Schedules (continued)	<ul style="list-style-type: none"> • Methods of including future pumping rates in models (i.e., avg GPM, well on/off cycles, max-min seasonal ranges, etc.). • Group discussion of how modeled future pumping will relate to actual pump operation, and how differences may affect modeling conclusions 	1:30 pm - 2:30 pm	All attendees
9.	Area Specific Hydrogeology	<ul style="list-style-type: none"> • How does the addition of A1 and A2 layers affect model output? • How do the effective porosities included in the models compare to area specific total porosities? The current model porosities range from 10% to 35% 	2:30 pm – 3:00 pm	All attendees
10.	Modeling Remedial Options	Needs, concepts, methods, to simulate remedial options	3:00 pm – 3:30 pm	All attendees
11.	Parking Lot Issues	Discuss any parking lots issues or issues not included in the agenda.	3:30 pm – 3:50 pm	All attendees
12.	Next Meeting	Discuss potential agenda items for the next meeting.	3:50 pm – 4:00 pm	All attendees

Note: one agenda item added for afternoon sessions—develop “wish list” of additional field data needed to fill gaps.

Meeting Attendees

Last Name	First Name	Company/Agency	Model/Group	Email
Bitner	Wayne	USAF-AFCEC		ludie.bitner@us.af.mil
Blaine	Tom	NMED	NMED	tom.blaine@state.nm.us
Brandwein	Sid	NMED-HWB	NMED	sid.brandwein@state.nm.us
Clark	Scott	KAFB	KAFB	scott.clark@us.af.mil
Ellinger	Scott	EPA Region 6	EPA	ellinger.scott@epa.gov
Gallegos	Billy	City of Albuquerque	all	bagallegos@cabq.gov
Hanna	Greg	Toeroek Assoc.	Facilitator	ghanna@toeroek.com
Kieling	John	NMED-HWB	NMED	john.kieling@state.nm.us
McBee	John	USACE	USACE	john.m.mcbree@usace.army.mil
McDonald	Bill	NMED-HWB	NMED	william.mcdonald@state.nm.us
Myers	Nathan	USGS	USGS	nmyers@usgs.gov
Reuter	Stephen	NMED		stephen.reuter@state.nm.us
Shean	Rick	ABCWUA	CH2M Hill-USGS	flshean@abcwua.org
Sigda	John	Intera	ABCWUA	jsigda@intera.com
Spaulding	Susan	EPA Region 6	EPA	spaulding.susan@epa.gov
Attended via Phone				
Cooper	Tom	CB&I	KAFB/CB&I	-
Murray	Clarissa	USACE	USACE	clarissa.m.murray@usace.army.mil
Teo	Jim	CB&I	KAFB/CB&I	james.teo@cbifederaleservices.com

After opening remarks and discussion items, the technical discussion began with an update on pumping rates provided by ABCWUA, KAFB, and the VA. These data had been circulating via email among the modelers after the February meeting established the need for reference pumping rates.

ABCWUA, Rick Shean and USEPA, Scott Ellinger

Rick and Scott discussed the reference pumping data provided by ABCWUA and how Scott had incorporated it into his model updates. The data were contained in a 12-month spreadsheet for each well in the ABCWUA system for the 2009-2010 time period. Rick provided a future water authority pumping forecast and rationale, consisting of actuals for 4 cycles of irrigation (March-Oct) and non-irrigation (Nov-Feb) seasons, starting from March 2010 and ending October 2013. Scott modeled a worst-case scenario for a conservative projection of groundwater pumping into the future, by selecting the greatest pumping rates during the irrigation and non-irrigation seasons. Modeling the worst-case was recommended on the water authority pumping forecast.

The group spent time evaluating the use of average values vs. actual pump rates. A typical well might pump at 650 gpm when the pump is on, but the pump might only run 50% of the time, so the average pumping rate is closer to 325 gpm. Since pumps cycle on a daily or hourly basis, the question was whether the larger (but shorter duration) cone effect at the pump would produce a different result for EDB transport than using the average pumping rate. The spacing grid and time steps of some of the models are generally too large to incorporate this level of detail, and there was general agreement that modeling extensive on/off pumping schedules would pose problems with model setup and run times.

As a potential solution to this question, Nathan (USGS) agreed to create a simple mock-up that could provide insight on the potential effects of using cyclic vs. average pumping rates. One member of the group recommended evaluating the models for their groundwater time constants as described by Gelhard and Wilson in a 1974 publication. The relationship between the time constant and the pumping cycle times could provide insight as to whether or not the model results would be influenced by incorporating cyclic pumping rates.

After some discussion about which averages to use and what to call them, the group agreed that linear averages during a dry season and wet season for 2009-2010 would form the "reference case" that all modelers would include in their next runs. The group further agreed that an additional case using higher pumping rates was required, and tasked Rick Shean from ABCWUA with providing the high-rate case. It is likely that this case will mimic the "worst case"

included in the contingency plan model created by CH2M Hill, but each supplier of pumping rates (ABCWUA, KAFB, and VA) agreed to review the numbers and confirm a high-pumping-rate case prior to the next meeting. KAFB also agreed to review their future pumping rates and determine whether they should be variable or constant over the course of a 12-month year.

Once the reference case and high-flow case pumping rates have been established, a combined table of the agreed-upon rates would provide the modelers with a quick reference summary. Assuming that the various water pumping entities can generate the data prior to the next meeting, Scott Ellinger indicated he is willing to prepare a summary table for distribution to the group.

Geology Update, Nathan Myers, USGS

Following the noon break, Nathan presented some additional data on the local geology of both the region and the specific area where the plume is located. This presentation included well bore data from the key down-gradient wells (Ridgecrest 5 and 3) as well as other wells nearby. All of the available data indicate that there is at least one and potentially two layers (the A2 and A1 layers) that exhibit markedly lower hydraulic conductivity. The depth and thickness of these layers varies from well to well.

One of the complicating factors discussed by the group is that the production wells (Ridgecrest 3 and 5, for example) are screened to large depths, with screened sections extending into the region between A2 and A1 and in some cases below A1. Given that the A2 and A1 layers inhibit vertical transport and groundwater flow, the group discussed to what degree the local geology, especially strata at lower elevations, needs to be incorporated into each model. Of particular concern was the allocation of pumped water volume to the various geological layers (as opposed to assuming uniform vertical hydraulic conductivity).

Although each of the models are constructed differently, there was general agreement among the group and the modelers that each would make alterations to incorporate the low-conductivity effects of the A1 and A2 layers. Model results incorporating these modifications are expected at the next modeling meeting. Scott provided a summary table showing how groundwater velocity increased when A1 and A2 were added.

Data Gaps and Potential Field Work

Each of the modelers offered their suggestions for closing data gaps through additional field study and well borings. Their combined list of potential activities includes:

1. Flow logs of Ridgecrest 5 and 3 or an adjacent location, potentially leading to transmissivity results for multiple layers/zones
2. Additional monitoring wells in the plume path or at locations where steep gradients exist. This could potentially include dye tracer tests to production wells, and better deep calibration to the north and northeast of the existing plume.
3. More characterization work in the LNAPL/EDB source zone to identify fluxes, attenuation/decay rates, and to confirm or enhance the CSIA data analysis.
4. Better definition of the vertical gradients
5. Boundary wells to establish boundary conditions
6. Well bore flow logging
7. Wells for down-gradient EDB monitoring
8. Understanding of the fault face along Louisiana Street and how it might affect or impact the plume
9. Seismic/resistivity work in the area to help better define subsurface geology

Potential Geology Session with Dr. John Hawley

As the group continued to process our understanding of the geology and its potential impact on the models and the plume itself, a great deal of interest arose about having a full-day session with Dr. John Hawley. Dr. Hawley is Emeritus Senior Environmental Geologist with the NM Bureau of Mines & Mineral Resources, has authored over 100 publications on geology of semi-arid western regions, and is held in high esteem by geology and groundwater professionals. As he is nearing retirement, the sentiment among the group was that it would be an excellent addition to our knowledge base if Dr. Hawley could spend an extended time discussing the local geology and its potential impact on our models.

Wrap-up and Next Meeting

The group discussed setting up two meetings—one in the 2nd or 3rd week of June to meet with Dr. Hawley, and a second meeting in the 2nd week of July to present updated results. Nathan Myers took the action to contact Dr. Hawley and determine his availability, and scheduling decisions will be built around what he learns. Nathan also offered to host the session with Dr. Hawley at the USGS facility in Albuquerque.